

HSR 2001 Program

Sunday, 10 June 2001

- 12:00 Registration
- 19:00 End of registration
- 20:30 Welcome reception

Monday, 11 June 2001

- 08:30 Registration (continued)
- 09:00 Welcome remarks
 - John A. Tsamopoulos HSR President & HSR 2001 Scientific Committee (Chairman)
 - Vlasios G. Mavrantzas HSR 2001 Organizing Committee (Chairman)
 - Costas Vayenas University of Patras, Vice-Rector

Morning session I: Dedicated to Prof. A. Acrivos, “Suspensions and particulates”

Chair: J.F. Brady, E. Mitsoulis

- 09:30 **Material instability and stress localization**
J.D. Goddard
University of California, San Diego, USA
- 09:50 **Capsule motion in flow: role of membrane rheology**
D. Barthès-Biesel, A. Diaz
UMR CNRS 6600, UTC, BP 20529, 60205 Compiègne, France
- 10:10 **Shear-induced corrugation of free interfaces in concentrated suspensions**
T. Loimer, A. Nir, R. Semiat
Dept. of Chemical Eng., Technion, Israel
- 10:30 **Linear stability analysis of thin leaky dielectric films subjected to electric fields**
Leonard F. Pease III, W.B. Russel
Dept. of Chemical Eng., Princeton University, USA
- 10:50 **Dynamic simulations of emulsion rheology**
R.H. Davis, Y. Wu, A.Z. Zinchenko
Dept. of Chemical Eng., University of Colorado, USA
- 11:10 *coffee break*

Morning session II: Dedicated to Prof. A. Acrivos, “Suspensions and particulates”

Chair: D. Barthès-Biesel, D. Vlassopoulos

- 11:30 **Second normal stress jump instability in non-Newtonian fluids**
J.F. Brady, I. Carpen
Division of Chemistry and Chemical Eng., California Institute of Technology, USA
- 11:50 **Shear-induced anisotropy in suspensions of spheres: causes and consequences**

F.A. Gadala-Maria
Dept. of Chemical Eng., University of South Carolina, USA

12:10 **Flow of dilute suspensions in capillary networks**

W.L. Olbricht, B.W. Roberts
School of Chemical Eng., Cornell University, USA

12:30 **Mechanism of reversible shear thickening in colloidal dispersions**

N.J. Wagner
Center for Molecular and Eng. Thermodynamics, Dept. of Chemical Eng.,
University of Delaware, USA

12:50 *end*

Afternoon session I: Dedicated to Prof. A. Acrivos, “Polymer dynamics”

Chair: J.-M. Piau, G. Georgiou

15:00 **Computational studies of the dynamics of liquid crystalline polymer in shear flows**

L. Gary Leal,¹ G. Sgalari,¹ J.J. Feng²
¹Dept. of Chemical Eng., Univ. of California at Santa Barbara, USA
²Levich Institute, City College of CUNY, USA

15:20 **A simple constitutive equation for entangled polymers incorporating CCR and chain stretching**

G. Ianniruberto, G. Marrucci
University Federico II, Piazzale Tecchio, Napoli, Italy

15:40 **Friction and dynamics of entangled polymer liquids**

L.A. Archer
School of Chemical Eng., Cornell University, USA

16:00 **Rheo-optical experiments and modeling of entangled polymer solutions: Steady and transient flows**

J. P. Oberhauser,¹ L.Gary Leal²
¹Dept. of Chemical Eng., University of Virginia, USA
²Dept. of Chemical Eng., University of California, Santa Barbara, USA

16:20 **Pure shear or planar extension, which name is misleading?**

C.J.S. Petrie
Dept. of Eng. Mathematics, University of Newcastle upon Tyne, UK

16:40 *coffee break*

Afternoon session II: Dedicated to Prof. A. Acrivos, “Newtonian Fluid Mechanics”

Chair: R.H. Davis, A.N. Beris

17:00 **Behavior of a free jet formed from an emulsion of two Newtonian fluids**

K. Sarkar, W.R. Schowalter
Dept. of Chemical Eng., University of Illinois at Urbana-Champaign, USA

17:20 **Two-dimensional model of phase segregation in liquid binary mixtures with an initial concentration gradient**

R. Mauri
Dept. of Chemical Eng., University of Pisa, Italy

- 17:40 **Mixing of a passive scalar near a free surface**
G.S. Triantafyllou,¹ L. Shen,² D.K.P. Yue²
¹Dept. of Naval Architecture and Marine Eng., NTUA, Greece
²Dept. of Ocean Eng., Massachusetts Institute of Technology, USA
- 18:00 **Stratified boundary layer flow of a gas stream and a liquid film past solid surfaces**
N.A. Pelekasis, D.N. Smyrniaios, J.A. Tsamopoulos
 Dept. of Chemical Eng., University of Patras, Greece
- 18:20 **Fluid Mechanics and Rheology Research Opportunities in Pharmaceutical R&D Technologies**
S. Kim
 Parke-Davis Company, USA
- 18:40 *end*
- 19:30 *Poster Session:*
1. **Mechanical properties and behavior of capsules in 3d flows**
E. Lac,¹ N.A. Pelekasis,² J.A. Tsamopoulos,² D. Barthès-Biesel¹
¹ CNRS UMR 6600, Université de Technologie de Compiègne, France
² Dept. of Chemical Eng., University of Patras, Greece
 2. **Modeling of viscous effects in blade coating flows**
E. Mitsoulis, G. Athanasopoulos
 Dept. of Mining Eng. & Metallurgy, NTUA, Greece
 3. **Temperature and shear induced thickening properties of aqueous solutions of n-isopropylacrylamide-based polymers**
G. Bokias,¹ Y. Mylonas,¹ G. Staikos,¹ D. Hourdet,² I. Iliopoulos,² G.G. Bumbu,³ C. Vasile³
¹Dept. of Chemical Eng., University of Patras, Greece
² ESPCI-CNRS-UPMC, PARIS, FRANCE
³“P.Poni” Institute of Macromolecular Chemistry, Romania
 4. **Steady-state fully-developed two-phase flow in porous media: Mechanistic model and a conjecture concerning the underline principle**
M. S. Valavanides,¹ A.C. Payatakes²
¹IRC Help-Forward/FORTH, Greece
²ICE/HT-FORTH and Dept. of Chemical Eng., University of Patras, Greece
 5. **Viscoelastic flow behavior of a side-chain nematic LC polyacrylate**
L. Hilliou,¹ A.G. Feio,¹ A.F. Martins,¹ D. Collin,² P. Martinoty²
¹Dept. Ciência dos Materiais, Universidade Nova de Lisboa, Portugal
²Unité Mixte de Recherche ULP-CNRS n°7506, 67070 Strasbourg Cedex, France

Tuesday, June 12 2001

Morning Session I: dedicated to Prof. A. Acrivos, "Non-Newtonian Fluid Mechanics"

Chair: W.B. Russel, J.A. Tsamopoulos

- 09:00 **Models for flow of non-Newtonian fluids through porous media**
J.R.A. Pearson
Schlumberger Cambridge Research & BP Institute, University of Cambridge, UK
- 09:20 **A suspension model for polymer solidification rheology**
R.I. Tanner
School of Aerospace, Mechanical and Mechatronic Eng., University of Sydney, Australia
- 09:40 **Viscoelastic contraction flows: Comparison of axisymmetric and planar configurations**
S. Nigen, K. Walters
Dept. of Mathematics, University of Wales, Aberystwyth, UK
- 10:00 **Viscoplastic Boundary Layers**
J-M. Piau
Laboratoire de Rhéologie, GRENOBLE Cedex 9, France
- 10:20 **Convergence of a regularization method for flow of a Bingham material past a sphere**
B.T. Liu,¹ S. J. Muller,¹ M.M. Denn²
¹Lawrence Berkeley National Laboratory and Dept. of Chemical Eng.,
University of California, Berkeley, USA
²Benjamin Levich Institute for Physico-Chemical Hydrodynamics, City College of CUNY,
USA
- 10:40 *coffee break*

Morning Session II

Chair: L.G. Leal, J.A. Tsamopoulos

- 11:00 **Particle migration and segregation in suspension flows undergoing shear**
A. Acrivos
- 12:00 *end*

Afternoon Session I: Polymer rheology

Chair: N. Wagner, V.G. Mavrantzas

- 14:00 **Rheology of dendrimers and their hybrid copolymers with linear polymers**
M.E. Mackay,¹ M. Jeong,¹ R. Vestberg,² C.J. Hawker²
¹Dept. of Chemical, Biochemical and Materials Eng., Stevens Institute of Technology, USA
²IBM Almaden Research Center, San Jose, USA
- 14:15 **Combining NMR and classical rheometry to evaluate the viscoelastic properties of main-chain nematic LC polymers**
A. Véron, A.F. Martins
Dept. Ciência dos Materiais, Universidade Nova de Lisboa, Portugal
- 14:30 **Microemulsions of ABA amphiphilic block copolymers and surfactants**
L. Braun-Shmueli, O. Netanel, O. Regev, M. Gottlieb
Dept. of Chemical Eng., Ben Gurion University, Israel

- 14:45 **High frequency dynamical viscometry on confined emulsions**
A. Romoscanu, M.B. Sayir, K. Häusler,¹ I. Roberts²
¹Swiss Federal Institute of Technology, Zurich, Switzerland
²Nestlé Research Center, Lausanne, Switzerland
- 15:00 **Telechelic polyelectrolytes: New developments in the rheology of aqueous formulations**
C. Tsitsilianis
 University of Patras and ICE/HT-FORTH, Greece
- 15:15 **Viscoelasticity and network structure of water-based polysaccharide systems**
A. Zupančič, U. Florjančič, M. Žumer
 University of Ljubljana, Slovenia

15:30 *coffee break*

Chair: A. Nir, S. Hatzikiriakos

- 16:00 **Elongational rheology of branched polypropylene**
A.D. Gotsis
 Delft University of Technology, the Netherlands
- 16:15 **Relaxational mechanisms in hyperstar melts**
D. Vlassopoulos,¹ T. Pakula²
¹IESL-FORTH, Crete, Greece
²Max-Planck Institut fuer Polymerforschung, Mainz, Germany
- 16:30 **Polymer brushes under strong shear flow in a good solvent**
*C. Toprakcioglu,¹ D. Anastassopoulos,¹ A. Vradis,¹ A. Papayianopoulos,¹ S. Baker,²
 A. Menelle³*
¹Dept. of Physics, University of Patras, Greece
²Harvey Mudd College, Claremont, California, USA
³Laboratoire Leon Brillouin, C.E –Saclay, France
- 16:45 **Block copolymers as emulsifiers in homopolymer blends: effects of additive MW, architecture, and composition**
S.H. Anastasiadis, H. Retsos
 IESL-FORTH and University of Crete, Greece
- 17:00 **Theoretical and experimental investigation of non-linear viscoelastic and viscoplastic response of amorphous polymers**
E. Kontou, G. Spathis
 Dept. of Applied Mathematical and Physical Sciences, NTUA, Greece

17:15 *coffee break*

Afternoon Session II: Drops and particulates

Chair: W.L. Olbricht, A.C. Payatakes

- 17:45 **Determination of the rheological properties of microcapsules**
M. Carin,¹ C. Postel,¹ M. Rachik,² D.Barthès-Biesel¹
¹UMR CNRS 6600, UTC, BP 20529, 60205 Compiègne, France
²Laboratoire Roberval, UTC, BP 20529, 60205 Compiègne, France
- 18:00 **The influence of walls on particle migration in suspensions**
W. Lin,¹ A. Kaiser,¹ A.L. Graham,¹ M.S. Ingber²
¹Texas Tech University
²University of New Mexico

- 18:15 **Dynamics of deformable surfactant-covered drops**
P. Vlahovska, J. Blawdziewicz, M. Loewenberg
Dept. of Chemical Eng., Yale University, USA
- 18:30 **Effects of turbulent motion on breakdown processes of natural fibers**
P. Perona, S. Sordo
Dipartimento di Idraulica, Trasporti e Infrastrutture Civili Politecnico di Torino, Italy
- 18:45 **Three-lobed shape formation of captive ferrofluid drops**
A.G. Papathanasiou, A.G. Boudouvis
Dept. of Chemical Eng., NTUA, Greece
- 19:00 *end*
- 20:30 *Banquet at ICE/HT-FORTH*

Wednesday, June 13 2001

Morning Session: Visit to Olympia

08:00 Visit to Olympia Archeological site and lunch

15:00 Return from Olympia

Afternoon Session I: Suspensions and colloids

Chair: L. Mondy, A. Gotsis

17:00 **Static yield stress measurements of suspensions**

D. De Kee, L. Zhu, K. Papadopoulos

Dept. of Chemical Eng., Tulane University, USA

17:15 **Variational inequalities in viscoplastic fluids – Theory & applications**

R.R. Huilgol

School of Informatics and Eng., Flinders University of South Australia

17:30 **The behavior of electrorheological fluids in torsional flow**

B. Abu-Jdayil,¹ P.O. Brunn²

¹Dept. of Chemical Eng., Jordan University of Science & Technology

²Dept. of Fluid Mechanics, University of Erlangen-Nurnberg, Germany

17:45 **Influence of macromolecular associations on the dilute properties of a clay suspension**

T. Aubry, F. Bossard, M. Moan

Laboratoire de Rhéologie, Université de Bretagne Occidentale, France

18:00 **Gelation phenomena in soft colloidal spheres**

E. Stiakakis, D. Vlassopoulos, G. Fytas, A. Rissanou, I.A. Bitsanis

IESL-FORTH, Crete, Greece

18:15 **Modeling the influence of mix proportions on correlation between destruction pace and thixotropy of suspensions**

T. Lyashenko,¹ V. Voznesensky,¹ Y. Ivanov²

¹Odessa State Building and Architecture Academy

²Bulgarian Academy of Sciences

18:30 *coffee break*

Chair: F. Gadala-Maria, N.A. Pelekasis

19:00 **Electrokinetically enhanced flow of coal-water suspensions in pipes**

P.K. Rozakeas,¹ R.J. Snow²

¹Dept. of Chemical and Metallurgical Eng., RMIT University, Australia

²Faculty of Eng., RMIT University, Australia

19:15 **Rheology of dense lignite-water suspensions; preshearing and transition stresses**

T.B. Goudoulas, E.G. Kastrinakis, S.G. Nychas

Dept. of Chemical Eng., Aristotle University of Thessaloniki, Greece

19:30 **Modeling shear induced particle migration**

L. Mondy,¹ R. Rao,¹ R. Lagasse,¹ M. Hopkins,¹ S. Altobelli,² M. Ingber,³

A. Mammoli,³ D. Fang³

¹Sandia National Laboratories, Albuquerque, NM

²New Mexico Resonance, Albuquerque, NM

³Dept. of Mechanical Eng., University of New Mexico

19:45 **The effects of pressure and temperature on the wall slip phenomenon of drilling muds**
K. Sadeghy,¹ S. Salimi,² M. Khairandish²
¹Dept. of Mechanical Eng., University of Tehran, Iran
²Research Institute of Petroleum Industry, Tehran, Iran

20:00 *end*

21:00 *Conference Dinner*

Thursday, June 14 2001

Morning Session I: Computational rheology

Chair: R.H. Colby, D. Theodorou

- 08:45 **A temporal nonlinear stability analysis of viscoelastic channel flows**
K. Atalik, R. Keunings
CESAME, Division of Applied Mechanics, Université catholique de Louvain, Belgium
- 09:00 **Numerical simulations of generalized Newtonian flows involving two free surfaces**
G. Georgiou, P. Lemenn, A. Alexandrou
¹Dept. of Mathematics and Statistics, University of Cyprus
²Dept. of Mechanical Eng., Worcester Polytechnic Institute
- 09:15 **Stress-induced migration effects on the Taylor-Couette flow of a dilute polymer solution**
M.V. Apostolakis,¹ V.G. Mavrantzas,¹ A.N. Beris^{1,2}
¹ICE/HT-FORTH Patras, Greece
²Dept. of Chemical Eng., University of Delaware, USA
- 09:30 *coffee break*

Morning Session II: Polymer processing

Chair: C. Tsenoglou

- 10:15 **Modeling of viscoplastic lid-driven cavity flow using finite element simulations**
E. Mitsoulis, M. Beaulne, D. Kammer, A. Zisis
Dept. of Mining Eng. & Metallurgy, NTUA, Greece
- 10:30 **Particle sintering and melt densification in rotational molding**
J. Vlachopoulos,¹ C. Bellehumeur,² M. Kontopoulou³
¹Dept. of Chemical Eng., McMaster University, ²University of Calgary
³Queen's University, Canada
- 10:45 **Viscoelastic modeling of micro-injection moulding**
C. Jeggy, F. Dupret
CESAME, Université catholique de Louvain, Belgium
- 11:00 **Rheology of polytetrafluoroethylene in paste extrusion**
A.B. Ariawan, S.G. Hatzikiriakos
Dept. of Chemical Eng., The University of British Columbia, Canada

Morning Session III: Polymer processing

Chair: A. Alexandrou, J. Vlachopoulos

- 11:15 **The influence of complex rheological properties on mixing**
L. Slemenik, A. Zupančič, M. Žumer
University of Ljubljana, Dept. of Chemical Technology, Slovenia
- 11:30 **Dynamical process of polyelectrolyte gel swelling - Swelling controlled solute release**
E.C. Achilleos, K.N. Christodoulou, I.G. Kevrekidis
- 11:45 **Multi-scale thermoplastic foam rheology modeling**
J. den Doelder
Dow Benelux N.V., The Netherlands

12:00 **MORNOS: A leading Greek plastics packaging company**
D. Giannakidis
MORNOS S.A., Thiva, Greece

12:15 *end*

Afternoon Session I: Complex Newtonian Fluid Flow

Chair: R.R. Huilgol, S. Anastasiadis

14:00 **Solitary wave dynamics of Newtonian film flows: Experiment and simulation**
M. Vlachogiannis, N. Malamataris, V. Bontozoglou
Dept. of Mechanical & Industrial Eng., University of Thessaly, Greece

14:15 **Two-phase flow in an undulating tube: Transitions from stratified to discontinuous flow of one of the fluids**
Ch. Kouris, J.A. Tsamopoulos
Dept. of Chemical Eng., University of Patras, Greece

14:30 **Analyzing Acrivos' experiments with finite elements**
D.P. Pazis, N.A. Malamataris
Dept. of Mechanical & Industrial Eng., University of Thessaly, Greece

14:45 **Low Reynolds number turbulent channel flow**
D. Jankovic,¹ A.N. Beris,² R. Keunings,¹ G.S. Winckelmans¹
¹CESAME, Université catholique de Louvain, Louvain-la-Neuve, Belgium
²Dept. of Chemical Eng., Univ. of Delaware, USA

15:00 *coffee break*

Afternoon Session II: Theory and modeling

Chair: L. Archer, V. Bontozoglou

15:30 **Double reptation predictions of the linear viscoelasticity of melt miscible polymer blends**
J.A. Pathak, R. Kant, S.K. Kumar, R.H. Colby
Materials Science and Eng., The Pennsylvania State University, USA

15:45 **Quantitative theory for linear rheology of linear entangled polymers**
A.E. Likhtman, T.C.B. McLeish
Polymer IRC, Physics Dept., University of Leeds, UK

16:00 **A GENERIC formulation of two-phase flow**
M. Hütter, H.C. Öttinger
Dept. of Materials, Institute of Polymers, ETH Zürich, Switzerland

16:15 **Non-Newtonian rheology of entangled polymer solutions and melts**
C. Tsenoglou
Dept. of Chemical Eng., NTUA, Greece

16:30 **Chain conformations and forces in physisorbed layers of homopolymer colloid stabilizers: Comparison between Monte Carlo and mean field predictions**
J. de Joannis,¹ J. Jimenez,¹ R. Rajagopalan,¹ J. Thomatos,² I.A. Bitsanis³
¹Dept. of Chemical Eng., University of Florida
²Interchem Hellas, Evia, Greece
³IESL-FORTH, Crete, Greece

16:45 **Prediction of the rheological properties of long polyethylene melts via atomistic molecular dynamics simulations**

V.A. Harmandaris, V.G. Mavrantzas, D.N. Theodorou
ICE/HT-FORTH and Dept. of Chemical Eng., University of Patras, Greece

17:00 closing remarks

17:15 end